Preferred Alternative

MEMORANDUM **CH2MHILL**

Pond A4 – Preferred Project Selection

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Summary

This Preferred Project Selection Memorandum identifies the Breach Alternative as the preferred project for Pond A4. The preferred alternative would allow for open tidal exchange rather than a managed pond scenario. This memorandum outlines the key decision point facing the Santa Clara Valley Water District (District) regarding management of Pond A4 – managed pond versus open tidal exchange operation.

This memorandum was prepared as part of the District's Quality Assurance/Quality Control process for project development. Preferred project selection follows previous memoranda addressing problem definition/refined objectives and conceptual alternative development. This memorandum summarizes the alternatives investigated, the alternative screening process, and identifies the preferred project.

Background

Pond A4 is a 310-acre former salt production pond in the Alviso Complex, which the District purchased from Cargill Salt Ponds. The surrounding ponds are managed by the U.S. Fish and Wildlife Service (USFWS), under its South Salt Pond Restoration Initial Stewardship Plan (ISP) for pond operations. USFWS has continued the historical circulation through Pond A4 with inflow from Pond A3W and outflow to Pond A5; however, the ISP does not provide for continued flows through Pond A4 and the USFWS plans to stop flows through Pond A4. Circulation through Pond A4 is critical to maintain habitat and water quality within the pond. The District originally intended for the pond to serve as a tidal marsh restoration site to fulfill mitigation requirements for the District's Stream Maintenance Program (Pond A4 Project Plan, April 2003). However, the District is negotiating a transfer of those mitigation obligations to an alternative site, Ponds 19, 20, and 21 in Coyote Creek. Transferring those obligations would trigger the need for a Water Management Plan for Pond A4 as an alternative to its use as a mitigation site.

Alternatives Investigated

The October 2004 Draft Conceptual Alternatives Analysis Report by Schaaf & Wheeler (S&W Draft Report) formed the basis for most of the alternatives considered in this memorandum. The primary basis for development of alternatives in the S&W Draft Report was management of salinity, although other issues were also considered. Eight project alternatives from the S&W Draft Report were considered using an evaluation matrix to summarize the qualitative evaluation criteria scores for each evaluation issue. An additional alternative, creating a breach in the levee and allowing open tidal exchange in the pond, was developed by CH2M HILL after the S&W Draft Report to address concerns about maintenance requirements and dissolved oxygen levels in pond discharges raised by Kirk Wheeler in a conference call with CH2M HILL and the District, based on the dissolved oxygen concerns at Pond A3 and A 18. The breach alternative was developed and evaluated independent of the Schaaf & Wheeler culvert alternatives and, therefore, there may be some inconsistencies in the degree of detail used for the evaluations.

Alternatives from the S&W Draft Report included the following:

- A no project alternative, where flows through Pond A4 would be cut off completely, allowing water levels to drop and salinity to increase
- A no discharge alternative where water would be taken into the Pond but none discharged, keeping water levels at or near existing levels but with corresponding increases in salinity
- Two alternatives using culvert intakes and discharges to Guadalupe Slough, either continuous (2a) or batch discharges (2b)
- An alternative (3) with a culvert intake and a pumped discharge to Guadalupe Slough
- Three alternatives discharging to Pond A5, one with an intake from Guadalupe Slough (4a) one from Pond A5 (4b) and one from A3 (4c)

The primary differences between alternatives identified in the S&W Draft Report relate to continuous circulation (using tidal cycles) versus batch operation (timing discharge to minimize negative effects to receiving waters); and to discharge to the slough versus discharge to neighboring ponds. The following breach alternative has been developed by CH2M HILL.

- An alternative that would create a breach in the levee, allowing free tidal exchange with Guadalupe Slough.

All of these alternatives were evaluated during Conceptual Alternatives Development. The primary difference between the Breach Alternative and previous alternatives is that this alterntive allows free tidal exchange and minimizes pond management and operation. Additionally, it is possible that monitoring requirements would be minimal.

Results of Managed Pond Analysis

The S&W Draft Report which only addressed managed pond alternatives concluded that Alternative 3, using a culvert intake and pumped discharge would be the preferred alternative for a managed pond system.

After circulation of the S&W Draft Report, the nearby Pond A3W, a managed pond, reported difficulties meeting discharge requirements for dissolved oxygen (DO), as reported by Kirk Wheeler in a conference call with CH2M HILL and the District to discuss the alternatives analysis. Ultimately, Pond A3W was the subject of a cease-and-desist order from the Regional Water Quality Control Board, requiring cessation of discharge until the DO issue could be resolved. It was determined that the A3W discharge culvert was located near a large mat of algae, which lowered DO levels at night, during natural respiration cycles. Concerns about DO were also raised during the permit process for Pond A18. Pond A18 ultimately received a discharge permit that included variances to the basin standards for DO (5 milligrams per liter [mg/L]). These variances allow discharges from Pond A18 to be less than 5 mg/L.

In response to concerns relative to the DO level in discharge water, Alternative 3 was modified from the S&W Draft Report to add an artificial aeration system to the discharge facility.

Alternatives Carried Forward

Table 1 presents alternatives carried forward for further evaluation and a list of factors used to qualitatively evaluate alternatives. Issues and objectives were evaluated relative to existing conditions:

+ was assigned if the alternative was considered *worse* than existing conditions,
++ was assigned for *same* as existing conditions,
+++ was assigned for *better* than existing conditions

Alternatives retained for further consideration include the following:

- No project
- Alternative 2a – culvert intake and discharge, with continuous circulation
- Alternative 3 – culvert intake, pumped discharge with batch operation and aeration
- Breach Alternative – continuous circulation through a breach in the levee

The No Project Alternative is carried forward as a means of comparison for the action alternatives. The No Project Alternative is not considered feasible, since the drying of the pond and increased salinity in the soils would not meet the District's goals. It was determined that discharge to nearby ponds, as described for Alternative 4, was infeasible because of possible conflicts with the ISP. Alternatives 2a and 3 were determined to be similar in terms of cost and maintenance. Because of the aeration system that could be incorporated into its design, Alternative 3 would have a greater chance of meeting the stringent DO discharge requirements. Discussions with the Regional Water Quality Control Board are needed to determine what the discharge requirements would be. Further assessment of these alternatives would also require additional analysis of DO through modeling.

TABLE 1
Retained Alternatives Evaluation – Qualitative Comparison[a]

	No Project	Managed Operation (Culverts with Continuous Circulation)	Managed Operation (Culvert Intake, Pumped Discharge, Batch Operation)	Open Tidal Pond Operation (Breach)
Source	S&W	S&W (2A)	S&W (3)	CH2M HILL
Description				
Intake	None	Culvert	Culvert	Breach
Discharge	None	Culvert	Pump	Breach
Operation	None	Continuous Circulation	Batch Circulation	Maintain Breach
Issues				
Pond Salinity	+	++	+++	+++
Pond Water Levels	+	++	+++	+++
Pond Habitat	+	++	++	+++
Slough Salinity	++	+	++	+++
Slough Habitat	++	++	++	++
Sediment Disposal	+	++	++	++
Cargill A4 Channel	++	++	++	++
FWS ISP Operation	++	++	++	+++
FWS Restoration	++	++	++	++
A4 Restoration	+	++	++	++
Construction Cost ($1,000s)	++	$1,300	$1,100	$1,000
Operation Cost ($1,001	++	$70	$160	$40
Permits	++	+	++	++
Recreation Access	++	++	++	++
Revised District Objectives				
Minimize need for active management	+	++	+	+++
Manage salinity and water quality to avoid discharge impacts	+++	+	++	+++
Manage as not to preclude future flood control options	+	++	++	++
Coordinate with related District projects and external projects conducted by other agencies	+	++	++	++
Develop mitigation credit system based on habitat likely to establish as result of water management	+	+	+	+++

[a] Note: Issues and Objectives were qualitatively scored using the following system:
+ = worse than existing conditions
++ = same as existing conditions
+++ = better than existing conditions

Managed Operation versus Open Tidal Pond

Selection of a preferred project hinges on the District's preference of managed pond versus an open tidal system for Pond A4 that would require minimal if any management. Both approaches present advantages and disadvantages. Selection of managed versus unmanaged operation is the key decision point for Pond A4.

Managed Operation

Managed operation of Pond A4, as required under Alternatives 2a and 3, would require ongoing efforts by the District to operate, monitor, maintain, and assess the condition of the pond in relation to the receiving waters (Guadalupe Slough). Selection of managed operation of Pond A4 would allow the District to maintain the pond as a resource for possible future use, including flood operations, sediment disposal, or other use such as future mitigation or restoration.

Open Tidal System

An open tidal system for Pond A4, as envisioned under the Breach Alternative, would likely preclude returning to a future managed pond condition. However, by allowing maximum tidal exchange in the pond, monitoring requirements would likely be minimized. Under an open tidal system, future projects would not be precluded; however, design and permitting of future projects may be more complicated due to the direct connection with the bay. Furthermore, breach operations would have the possibility of creating inter-tidal mudflats, which could count for future mitigation credits.

Discussion

All of the alternatives discussed below are independent of the ISP. They do not depend on or interfere with ISP operations or restoration. None of the alternatives discussed below would exacerbate existing flood management issues in the Pond A4 area.

Passive Culvert Alternative

A passive culvert alternative could meet pond salinity objectives but could be significantly constrained by DO discharge requirements. To maintain DO requirements, discharge could be limited to low tides during daylight hours. Pond water levels would be determined by the elevation of the culverts and operation of flap gates. Pond habitat would be essentially unchanged and slough habitat would sustain minor impacts due to construction. Minimal changes to salinity in the slough would occur.

Future uses of Pond A4 would not be limited. Sediment disposal or incorporation into a regional flood control project could be an option. A passive culvert alternative would require active operation, frequent maintenance inspections, and could involve significant compliance monitoring. An annual operation plan would be developed to meet pond water maintenance objectives, and would be followed and modified as needed.

The construction costs of the passive culvert alternative are not excessive, however operation and monitoring costs could be high. There are concerns that this alternative could not meet DO discharge requirements. Permits could be difficult to secure. Existing recreational use in the area would not be impacted following construction.

Pumped Culvert Alternative

The pumped culvert alternative would meet pond salinity water levels and DO discharge objectives. Pump sizing and operation, along with aeration, would be designed to meet established standards. The ability to pump the discharge water at essentially any tidal stages would add significant flexibility and reliability to the active operation of the pond. Pond habitat would be essentially unchanged. Other than construction impacts, no significant change in slough salinity or habitat quality would occur, and future uses of Pond A4 would not be constrained.

The pumped culvert alternative would require active operation, frequent maintenance inspections, and could involve significant compliance monitoring. An annual operation plan would be developed to meet pond water maintenance objectives. That plan would be followed and modified as needed. The construction costs of the pumped culvert alternative are not significantly different from the other alternatives. Operation, maintenance, and monitoring costs could be relatively high. This alternative would be operated to meet discharge requirements. Permits should not be difficult to obtain. Existing recreation would not change following construction.

Breach Alternative

The Breach Alternative would meet pond salinity, pond water level, and DO discharge requirements by virtue of its equilibrium with Guadalupe Slough. After a few initial tidal cycles, water quality and water levels in Pond A4 would be controlled by tidal action from the slough. Pond habitat would change slowly over time. Intertidal areas (about 20 percent of the pond bottom) would develop as a function of pond bottom elevations. Over time, these exposed mudflat areas could revegetate and develop into brackish water tidal marsh. Pond margin habitat would likely increase and would be dominated by pickleweed. These improvements in habitat quality within the Pond from the open breach and tidal flows allow the potential for negotation of mitigation credits for these types of habitat with the resources agencies, for future SCVWD project.

Future uses of Pond A4 could be more complicated under a Breach Alternative due to the dynamic nature of an open pond system. The pond would clearly become a "Water of the State" by virtue of its open connection to Guadalupe Slough. However, current RWQCB staff also consider water within managed ponds to be waters of the state.

The Breach Alternative would require essentially no operation. Maintenance inspections would be infrequent. Construction costs would be in line with the other alternatives, and monitoring costs would likely be limited. Once the pond's initial performance was established, monitoring would be only periodic. Because of this alternative's lack of operational complexity, permits should be relatively easy to obtain.

Public Input and Comments

Public input and comments have not been considered during the project selection, although some stakeholder input has been received on the breached alternative from the previous tidal restoration project meetings. Public input will be considered during the environmental documentation and permitting process. Policy implications from selection of managed operation versus an open tidal pond system will be considered by the District at the appropriate time.

Least Damaging Practicable Alternative (404 permit)

The Breach Alternative is the least damaging practicable alternative because it would open Pond A4 to full exchange with the bay. Short-term construction impacts are likely outweighed by long-term environmental benefits of opening the pond to the bay.

Environmentally Superior Alternative (CEQA)

The Breach Alternative is the environmentally superior alternative because it would open Pond A4 to full exchange with the Bay. Short-term construction impacts are likely outweighed by long-term environmental benefits of opening the pond to the Bay.

Data Gaps

The following items represent data or information gaps in the understanding of Pond A4. Information collected on these issues may change the understanding of Pond A4 and possibly the recommendation of a preferred alternative.

Mitigation Credits

Pond management alternatives could provide an opportunity for enhancement of existing habitat conditions, for instance by increasing intertidal habitat values or by increasing tidal marsh formation. There may be an opportunity to negotiate a credit system with the regulatory agencies for these enhancements, which could then be used to offset the District's current or future mitigation needs. However, at this time, no firm commitment has been made by resource agencies relating to the mitigation potential of Pond A4.

Scour Analysis

Hydraulic effects of the Breach and Managed Pond Alternatives have not been fully evaluated. It is possible that the tidal action through a breach would affect the local levee system. It is also possible that the tidal action through the breach could require riprap or other anti-erosion measures. Scour in the slough may also occur as a result of the managed pond operations.

Recommendation

The Breach Alternative minimizes the need for active management. The pumped culvert and the Breach Alternative could avoid long term discharge impacts. The Breach Alternative would be more reliable in avoiding these impacts. None of the alternatives preclude future flood control options. The Breach Alternative could make future modifications internal to Pond A-4 difficult. None of the alternatives conflict with existing or foreseeable projects external to the District.

Only the Breach Alternative offers the opportunity to establish future wetland habitat mitigation credits.

On the basis of available information and the criteria used for this analysis, the Breach Alternative is superior.